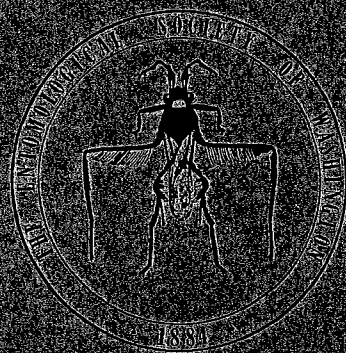


THE FLOWER FLIES OF THE
WEST INDIES
(DIPTERA SYRPHIDAE)



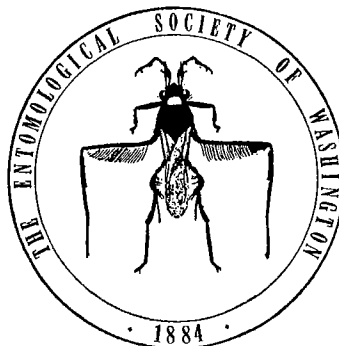
by
F. CHRISTIAN THOMPSON

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Number 9

THE FLOWER FLIES OF THE
WEST INDIES
(DIPTERA: SYRPHIDAE)

by

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TABLE OF CONTENTS

Abstract	4
Acknowledgments	5
Introduction	7
Economic Importance	7
Distribution	9
Taxonomy	13
Key to Genera of West Indian Syrphidae	17
<i>Syrphus</i> Fabricius	20
<i>Allograpta</i> Osten Sacken	23
<i>Pseudodoros</i> Becker	33
<i>Ocyptamus</i> Macquart	34
<i>Salpingogaster</i> Schiner	63
<i>Toxomerus</i> Macquart	65
<i>Leucopodella</i> Hull	103
<i>Rhysops</i> Williston	105
<i>Xanthandrus</i> Verrall	105
<i>Paramicrodon</i> de Meijere	111
<i>Mixogaster</i> Macquart	111
<i>Microdon</i> Meigen	112
<i>Trichopsomyia</i> Williston	116
<i>Ornidia</i> Lepeletier and Serville	119
<i>Copestylum</i> Macquart	120
<i>Lepidomyia</i> Loew	141
<i>Orthonevra</i> Macquart	141
<i>Helophilus</i> Meigen	142
<i>Quichuana</i> Knab	143
<i>Eristalis</i> Latrielle	145
<i>Eoseristalis</i> Kanervo	146
<i>Palpada</i> Macquart	147
<i>Meromacrus</i> Rondani	155
<i>Ceriana</i> Rafinesque	164
<i>Milesia</i> Latreille	167
<i>Neplas</i> Porter	167
<i>Sterphus</i> Philippi	173
Literature Cited	175
Appendix	185
Index	197

ABSTRACT

A taxonomic analysis of the flower flies of the West Indies is presented. Keys and illustrations are provided for 27 genera and 129 species. Complete bibliography and synonymy are given for each species. The economic importance and distribution of these flies are discussed.

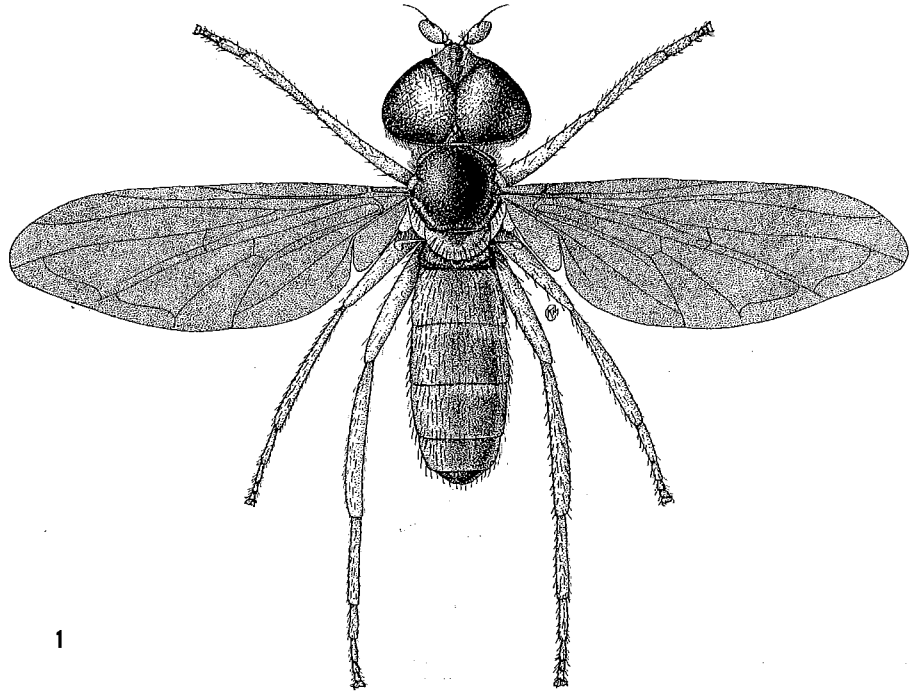
Eight unused senior synonyms are identified and revived, in addition 46 new junior synonyms are proposed: *Allograpta radiata* (Bigot) (= *cubana* Curran and *venusta* Curran); *Ocyptamus antiphates* (Walker) (= *rufiventris* Bigot, *scutellatus* Loew and *loewi* Sedman); *O. cylindricus* (Fabricius) (= *conformis* Loew and *vockerothi* Telford); *O. capitatus* (Lowe) (= *insuralis* Bigot and *carlota* Curran); *O. lepidus* (Macquart) (= *crocata* Austen); *O. cubanus* (Hull) (= *calypso* Hull); *O. dimidiatus* (Fabricius) (= *latiusculus* Loew); *Salpingogaster punctifrons* Curran (= *relicta* Curran); *Toxomerus dispar* (Fabricius) (= *basilaris* Wiedemann and *imperialis* Curran); *T. floralis* (Fabricius) (= *subannulatus* Loew); *T. pulchellus* (Macquart) (= *laciniosus* Loew); *T. pictus* (Macquart) (= *extrapolatus* Hull); *T. verticalis* (Curran) (= *mitis* Curran and *rhodope* Hull); *Leucopodella gracilis* (Williston) (= *asthenia* Hull, *gowdeyi* Curran, *carmelita* Hull and *estrelita* Hull); *L. bigoti* (Austen) (= *lanei* Curran); *L. balboa* Hull (= *bella* Hull); *L. incompta* (Austen) (= *olga* Hull); *Rhysops praeustus* (Loew) (= *quadrimaculatus* Hull); *Microdon remotus* Knab (= *banksi* Hull); *Copestylum brunneum* Thunberg (= *exinanita* Gmelin, *inanis* Fabricius, *esuriens* Fabricius, and *adjuncta* Walker); *C. pusillum* (Macquart) (= *horvathi* Szilady); *C. vacuum* (Fabricius) (= *unipunctata* Curran and *pulchrapuella* Hull); *Palpada agrorum* (Fabricius) (= *gundlachi* Loew); *P. atrimana* (Loew) (= *willistoni* Townsend); *P. interrupta* (Fabricius) (= *penaltis* Curran); *Meromacrus pinguis* (Fabricius) (*potens* Curran); *M. milesiformis* (Macquart) (= *opulentus* Bigot); *M. pratorum* (Fabricius) (= *maculata* Macquart and *flukei* Curran); *Sterphus jamaicensis* (Gmelin) (= *nigrata* Fabricius, *nigrana* Turton, and *tricrepis* Shannon). Four species are removed from synonymy (*Toxomerus luna* (Hull), *Copestylum sexmaculatum* (Palisot de Beauvios), *Meromacrus panamensis* Curran, and *M. milesiformis* (Macquart)).

Twenty new species and 1 new subgenus are described: *Allograpta insuralis* (Puerto Rico); *Ocyptamus ferrugineus* (Puerto Rico); *O. superbus* (Jamaica); *Syrphus vockerothi* (Jamaica and Hispaniola); *Toxomerus buscki* (Hispaniola), *T. elinorae* (Jamaica), *T. rohri* (St. Croix); *Xanthandrus (Androsyrphus) setifemoratus* (Jamaica), *X. tricinctus* (Dominica); *Trichopsomyia antillensis* (Puerto Rico and Jamaica); *Copestylum hispaniolae* (Hispaniola), *C. pseudopallens* (Jamaica), *C. rectifacies* and *C. infractum* (Dominica); *Quichuana dominica* (Dominica); *Palpada xanthosceles* (Dominica); *Meromacrus farri* (Jamaica); *Ceriana fabricii* (Bahamas), *C. weemsi* (Cuba); *Neplas bettyae* (Cuba).

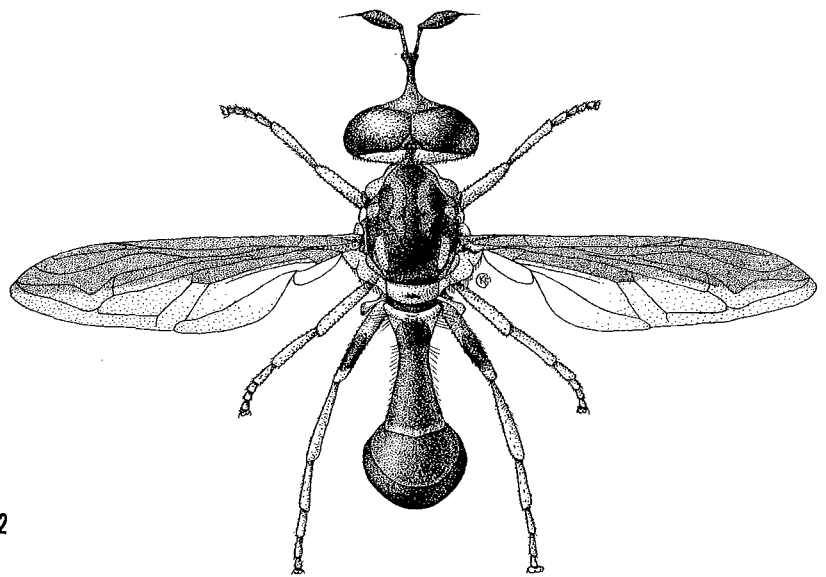
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Also I thank Raymond J. Gagné, Ronald W. Hodges, David R. Smith, and Edward L. Todd, Systematic Entomology Laboratory, USDA, Washington, D.C., and J. R. Vockeroth, Agriculture Canada, Ottawa, for their critical reading of the manuscript. Figures 1 and 2 were prepared by Kathryn Conway to whom I am grateful. All other figures were prepared by the author.



1



2

Fig. 1. *Ocyptamus antiphates*, habitus. 2, *Ceriana tricolor*, habitus.

INTRODUCTION

Islands and their biotas have always intrigued the scientist. Since the acceptance of Darwinian Evolution by biologists, island biotas have left them with the obvious questions of when and from where did the plants and animals come. With the advent of Plate Tectonics the same questions can also be asked concerning the islands themselves. Part of the basic data needed to answer these questions of the origin and age of islands and their biotas is the enumeration of their respective components. This paper is a contribution toward that goal.

The Syrphidae of the West Indies are poorly known. No comprehensive treatment of the flower flies of any part of the Neotropics exists. Most of the species descriptions and keys are widely scattered through many journals and books. While there are a few general papers on the flies of various islands, only two papers have dealt exclusively with the Syrphidae of a particular area (Bahamas—Johnson, 1908. Jamaica—Cockerell, 1892, 1894; Johnson, 1894, 1919; Gowdey, 1926, 1928. Haiti—Wolcott, 1927. Puerto Rico—Roeder, 1885; Coquillett, 1900; Curran, 1928b; Wolcott, 1923, 1936, 1941, 1948; Ramos, 1946; Maldonado Capriles and Navarro, 1967; Telford, 1973 (syrphids only). Lesser Antilles—Williston, 1896; Curran, 1928b, 1939d; Beatty, 1944; Tucker, 1952, 1953; Miskimen and Bond, 1970; Doesburg, 1970 (syrphids only)). All of these papers include numerous misidentifications, usage of junior synonyms, or confused species concepts; more than one-half of the species listed in a recent paper on the Syrphidae of Puerto Rico (Telford, 1973) belonged in one of these categories.

This paper began as a study of the Syrphidae of Dominica based on the extensive collections made by the Bredin-Archbold-Smithsonian Biological Survey of that island. Due to the chaotic state of the taxonomy of West Indian Syrphidae alluded to above, I was forced to review the whole fauna to determine the correct names for many of the Dominican species. The results of that work are presented here although they are preliminary in nature. It is anticipated that attention will be attracted to the problems of the West Indian syrphid fauna which will lead to their eventual resolution.

I have used the word "synopsis" for this paper for several reasons. First, this is not an exhaustive study of all the existing West Indian syrphid material. Second, the included taxa have not been redescribed except in those very few cases where no adequate descriptions now exist. Third, while I feel I have solved most of the nomenclatural problems involving West Indian Syrphidae, I am certain that many biosystematic questions need further investigation, such as the specific status of various island forms.

ECONOMIC IMPORTANCE

The economic importance of Syrphidae cannot be given precisely in dollars and cents, but there is little doubt that syrphids are overall very ben-

eficial to man and his environment. On the positive side many syrphid flies are of importance as predators of injurious insects, pollinators of flowers, and as objects of man's curiosity. On the negative side only a few syrphids cause further injury to rotting plants or cause accidental myiasis in man.

Larvae of the subfamily Syrphinae are predators on many injurious insects. They have been recorded as feeding on planthoppers (Fulgoroidea), spittlebugs (Cercopoidea), leafhoppers (Cicadelloidea), whiteflies (Aleyrodoidea), aphids (Aphidoidea), scales and mealybugs (Coccoidea), and thrips (Thysanoptera). Studies of syrphid predators of aphids have shown that the typical syrphid larva consumes from a minimum of a few hundred aphids to a maximum of over a thousand aphids over a developmental period of a week or two. Consumption figures are not available for most of the other groups of prey. To date syrphids have been introduced several times as biological control agents and all these introductions have been into Hawaii.

Syrphid flies are common around and on flowers, which usually are used as sites for courtship activity. They feed on pollen and nectar, and in doing so their pilosity picks up and carries much pollen. Thus syrphids form one of the dominant groups of plant pollinators. The use of syrphid flies as pollinators of commercial crops has been virtually nil. As early as 1890 *Eristalis tenax* (Linnaeus) was recommended as a pollinator for greenhouse grown chrysanthemums. Recently, the Japanese have suggested the use of other species of *Eristalis* as pollinators of a large variety of crops, such as strawberry, melons, apples, pears, and peaches.

Adult syrphids are large showy flies and have, like butterflies (although to a lesser extent), attracted the attention of amateur entomologists. Thus in countries such as England and other European nations, where insect collecting is a prominent avocation, syrphids have an important recreational value.

A few syrphid larvae are injurious, but in all cases where they are such, the larvae are either secondary or accidental pests. Some species (*Merodon* and *Eumerus*) are saprophytes that feed in rotting ornamental plant bulbs and, rarely, onions. These species are always secondary pests, infesting the bulbs after they have started to rot. Other syrphids that breed in rot holes in trees and rotten logs are secondary saprophytes. Another syrphid (*Cheilosia*) has been incriminated as the cause of black check of timber, a common defect consisting of a black scar in lumber. This defect is caused by the syrphid maggot feeding in a sap wound initially formed by a scolytid beetle. Rat-tailed maggots (the larvae of certain eristaline genera) have been reported to cause myiasis in man. These cases are caused by drinking putrid water containing the immature stages of the syrphid and are thereby termed as accidental myiasis.

Table 1. West Indian syrphid fauna by major islands or island groups.

Area	Total		% Endemic	Augmented Totals	
	Genera	Species		Genera	Species
Cuba	20	67	33	21	70
Hispaniola	13	38	25	15	51
Jamaica	19	56	26	19	59
Puerto Rico	12	49	18	12	49
Lesser Antilles	11	34	29	11	34
Bahamas	7	12	8	8	19

DISTRIBUTION

With so little known about West Indian Syrphidae and those of the Neotropics in general and with much of that inaccurate, it is premature to discuss the zoogeography of the Antillean forms. Nevertheless, a general picture can be developed by examining the statistics of the fauna and the distribution patterns of the included taxa.

Syrphidae are a large world-wide group with more than 5,000 species and with the greatest number occurring in the Neotropical Region (1637)¹. The Neotropical fauna consists of representatives of all three subfamilies, 15 of the 18 tribes, and 73 of the 206 genera. The West Indian fauna is considerably smaller, with representatives of all subfamilies, 10 tribes, 23 genera, and 129 species. However, considering the amount of land in the West Indies, which is about .1% of world land area and 1% of the Neotropics, the Antillean fauna is quite diverse with about 3% of the world fauna and 8% of the Neotropical fauna.

The number of genera, species, and the percent of the total species which are endemic are given for each major island or island group in Table 1. The relationship of these numbers roughly corresponds to that between the sizes of the islands or island groups with the exception of Hispaniola. Hispaniola is the second largest Antillean island and is about ten times as large as Puerto Rico, yet its known syrphid fauna is smaller than that of Puerto Rico. I attribute this discrepancy to sampling error, that is, Hispaniola has not been as well collected as Puerto Rico. This sampling error can be partially corrected by augmenting the number of taxa by adding those species which

¹ The number of species for the Nearctic and Neotropical Regions used in this paper are based on *A Catalog of the Diptera of America north of Mexico* (Wirth et al., 1965) and *A Catalogue of the Diptera of the Americas south of the United States* (Thompson et al., 1976). A small fraction of the Nearctic species have been included in the Neotropical species totals. It is virtually impossible at the present time to separate the Mexican fauna into its Nearctic and Neotropical components because many of the species involved are still known only from "Mexico."

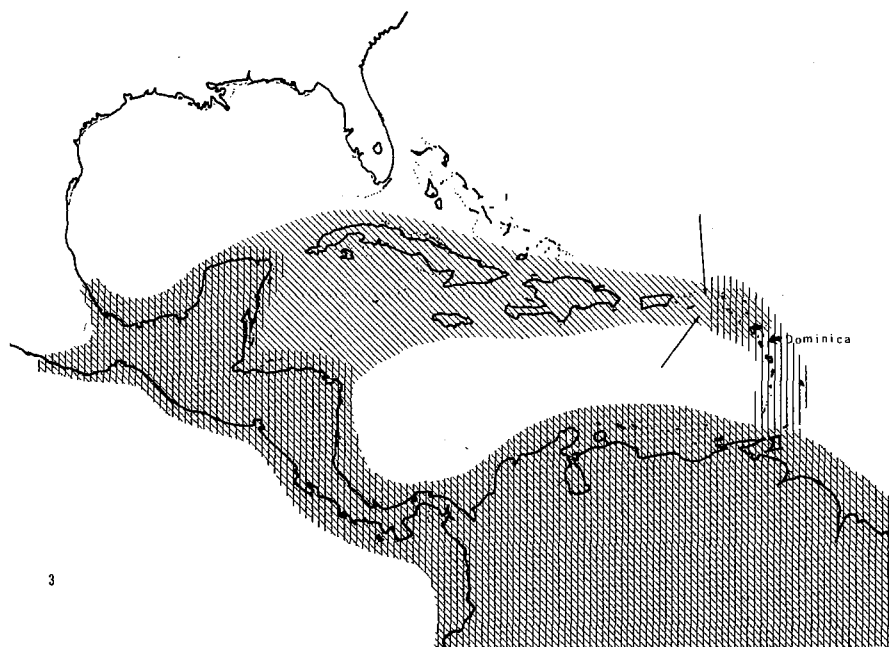


Fig. 3. Generalized distribution patterns of some Antillean Syrphidae. Diagonal lines = western continental elements; vertical lines = southern continental elements (after Howard, 1973: fig. 4).

will undoubtedly be found on the island. For example, *Toxomerus pictus* (Macquart) is a common widespread species found throughout Central and South America, south to Argentina, and on Cuba, Jamaica, Puerto Rico, and many of the Lesser Antilles. It should be expected to occur on Hispaniola also. By study of distribution patterns I have been able to identify "missing species" and have augmented the respective total accordingly.

The Antillean fauna can be categorized on the basis of the distribution of the included species. The distribution patterns of the species studied conform to those patterns described for better known groups such as plants (Howard, 1973). According to Howard (1973: 19, Fig. 4, here redrawn as

Table 2. Major distribution patterns of the West Indian syrphid fauna.

Type of Pattern	No. Species	% Fauna
Widespread elements	27	21
Western elements	4	3
Southern elements	3	2
Endemic elements	95	74
Widespread	29	23
Related	37	28
Unique	29	23

Table 3. Generic level affinities of the West Indian syrphid fauna.

Type of Affinity	% Fauna by Range
Cosmopolitan	9
Pantropical	13
North Temperate	13
Ethiopian-Neotropical	9
Neotropical	57

Fig. 3), the major patterns of plant distributions within the Antilles consist of: 1) Widespread elements, whose ranges include portions of Central, South, and frequently North America; 2) western continental elements, whose ranges include portions of Central and South America and "extend eastward across the Greater Antilles usually terminating in the Virgin Islands (arrows), but with examples extending into Guadeloupe"; 3) southern continental elements, whose ranges include portions of Central and South America and "extend northward in the Lesser Antilles"; and 4) endemic elements, whose ranges are restricted to the Antilles. Among the endemic elements there appear to be three distinct patterns: 1) Related endemics, endemic species on each major island or island group, whose sister-species are endemic to the other islands; 2) unique endemics, endemic species whose sister-species are found outside of the Antilles; and 3) widespread endemics, species endemic to the West Indies as whole or to more than one island (Table 2).

The affinities of the West Indian fauna can be also assessed (although crudely) by examining these distribution patterns and the phylogenetic relationships of the included taxa. On the generic level (Table 3) we can characterize the relationships of the fauna on the basis of the total range of the genera found within it. For example, a genus found throughout the world is scored as cosmopolitan (e.g. *Microdon*) and a genus found mainly in the northern continents (e.g. *Syrphus*) is scored as north temperate. On the specific level (Table 4) the affinities are indicated by two figures: 1) Those widespread species which range outside of the West Indies are scored on the basis of their total range as was done for the genera; and 2) the endemic species, as well as the widespread ones, are scored on the basis of the combination of their range and that of their sister-group (see Thompson, 1972: 184-200, maps 7-11, for more details on Neotropical syrphid zoogeography). In summary, these figures indicate that the majority of the Antillean syrphids have Neotropical affinities.

Table 4. Specific level affinities of the West Indian syrphid fauna.

Type of Affinity	% Fauna by Range	% Fauna by Relationship
New World	9	16
Nearctic	10	14
Neotropical	12	70

DISTRIBUTIONAL LIST OF WEST INDIAN SYRPHIDAE

Species known to occur in the West Indies are listed by major islands or island groups. Species doubtfully recorded are not included.

BAHAMAS: *Allograpta radiata*; *Ocyptamus cylindricus*, *O. lineatus*; *Toxomerus arcifer*, *T. floralis*, *T. verticalis*; *Ornidia obesa*; *Copestylum abdominale*, *C. eugenia*; *Palpada albifrons*, *P. hortorum*; *Ceriana fabricii*.

CUBA: *Allograpta flukei*, *A. radiata*; *Pseudodoros clavatus*; *Salpingogaster bruneri*, *S. punctifrons*; *Ocyptamus aequilineatus*; *O. jactator*, *O. capitatus*, *O. antiphates*, *O. cylindricus*, *O. dimidiatus*, *O. cubanus*, *O. species B*, *O. notatus*, *O. parvicornis*, *O. hyacinthus*, *O. bromleyi*, *C. costatus*; *Toxomerus aeolus*, *T. arcifer*, *T. difficilis*, *T. dispar*, *T. floralis*, *T. maculatus*, *T. pictus*, *T. politus*, *T. puella*, *T. valdesi*, *T. watsoni*, *T. species A*; *Leucopodella gracilis*; *Rhysops praeustus*; *Xanthandrus cubanus*, *X. simplex*; *Paramicrodon delicatulus*; *Mixogaster cubensis*; *Microdon brusei*, *M. inaequalis*, *M. laetus*, *M. remotus*; *Ornidia obesa*; *Copestylum abdominale*, *C. apicale*, *C. bruneri*, *C. pubescens*, *C. pusillum*, *C. sexmaculatum*; *Orthonevra gewgaw*; *Lepidomyia calopus*; *Palpada agrorum*, *P. albifrons*, *P. atrimana*, *P. hortorum*, *P. vinetorum*; *Meromacrus bruneri*, *M. decorus*, *M. milesiformis*, *M. pinguis*, *M. ruficrus*; *Ceriana tricolor*, *T. weemsi*; *Neplasp bettyae*, *N. pachymera*, *N. pretiosus*, *N. proximus*; *Sterphus jamaicensis*.

JAMAICA: *Syrphus vockerothi*; *Allograpta funeralia*, *A. neotropica*, *A. obliqua*, *A. radiata*, *A. species A*; *Pseudodoros clavatus*; *Salpingogaster nigra*; *Ocyptamus aequilineatus*, *O. iris*, *O. superbus*, *O. antiphates*, *O. cylindricus*, *O. dimidiatus*, *O. sagittifer*, *O. lineatus*, *O. notatus*, *O. parvicornis*, *O. oenone*; *Toxomerus arcifer*, *T. difficilis*, *T. dispar*, *T. elinorae*, *T. floralis*, *T. maculatus*, *T. pictus*, *T. politus*, *T. pulchellus*, *T. verticalis*, *T. violaceus*, *T. watsoni*; *Leucopodella gracilis*; *Rhysops praeustus*; *Xanthandrus setifemoratus*; *Microdon inaequalis*, *M. laetus*, *M. violens*; *Trichopsomyia antillensis*; *Ornidia obesa*; *Copestylum apicale*, *C. exeugenia*, *C. intona*, *C. pseudopallens*, *C. sexmaculatum*, *C. vacuum*; *Lepidomyia calopus*; *Palpada agrorum*, *P. albifrons*, *P. atrimana*, *P. vinetorum*; *Meromacrus farri*, *M. pinguis*; *Ceriana daphnaeus*; *Neplasp pachymera*, *N. pretiosus*; *Sterphus jamaicensis*.

HISPANIOLA: *Syrphus vockerothi*; *Allograpta aenea*, *A. ascita*, *A. neotropica*; *Pseudodoros clavatus*; *Ocyptamus antiphates*, *O. cylindricus*, *O. dimidiatus*, *O. fasciatus*, *O. oriel*; *Toxomerus arcifer*, *T. aurulentus*, *T. buscki*, *T. dispar*, *T. floralis*, *T. ornithoglyphus*, *T. politus*, *T. pulchellus*, *T. una*, *T. veve*, *T. watsoni*, *T. species A*; *Leucopodella gracilis*; *Xanthandrus simplex*; *Microdon bruesi*, *M. pulcher*; *Ornidia obesa*; *Copestylum hispaniolae*, *C. purpurascens*, *C. sexmaculatum*; *Palpada agrorum*, *P. albifrons*, *P. atrimana*, *P. hortorum*, *P. vinetorum*; *Meromacrus pinguis*, *M. pratorum*; *Neplasp pretiosus*.

PUERTO RICO: *Allograpta insularis*, *A. limbata*, *A. radiata*; *Pseudodoros clavatus*; *Ocyptamus capitatus*; *O. cylindricus*, *O. dimidiatus*, *O. fasciatus*, *O. ornatipes*, *O. neoparvicornis*, *O. ricus*, *O. species B*, *O. ferrugineus*, *O. parvicornis*, *O. deceptor*, *O. martorelli*, *O. medina*; *Toxomerus arcifer*, *T. aurulentus*, *T. difficilis*, *T. dispar*, *T. floralis*, *T. luna*, *T. maculatus*, *T. pictus*, *T. politus*, *T. pulchellus*, *T. verticalis*, *T. violaceus*, *T. watsoni*, *T. species A*; *Leucopodella gracilis*, *L. incompta*; *Xanthandrus cubanus*, *X. simplex*; *Trichopsomyia antillensis*; *Ornidia obesa*; *Copestylum apicale*, *C. brunneum*, *C. sexmaculatum*, *C. vacuum*; *Palpada agrorum*, *P. albifrons*, *P. atrimana*, *P. hortorum*, *P. vinetorum*; *Meromacrus pinguis*, *M. pratorum*; *Sterphus jamaicensis*.

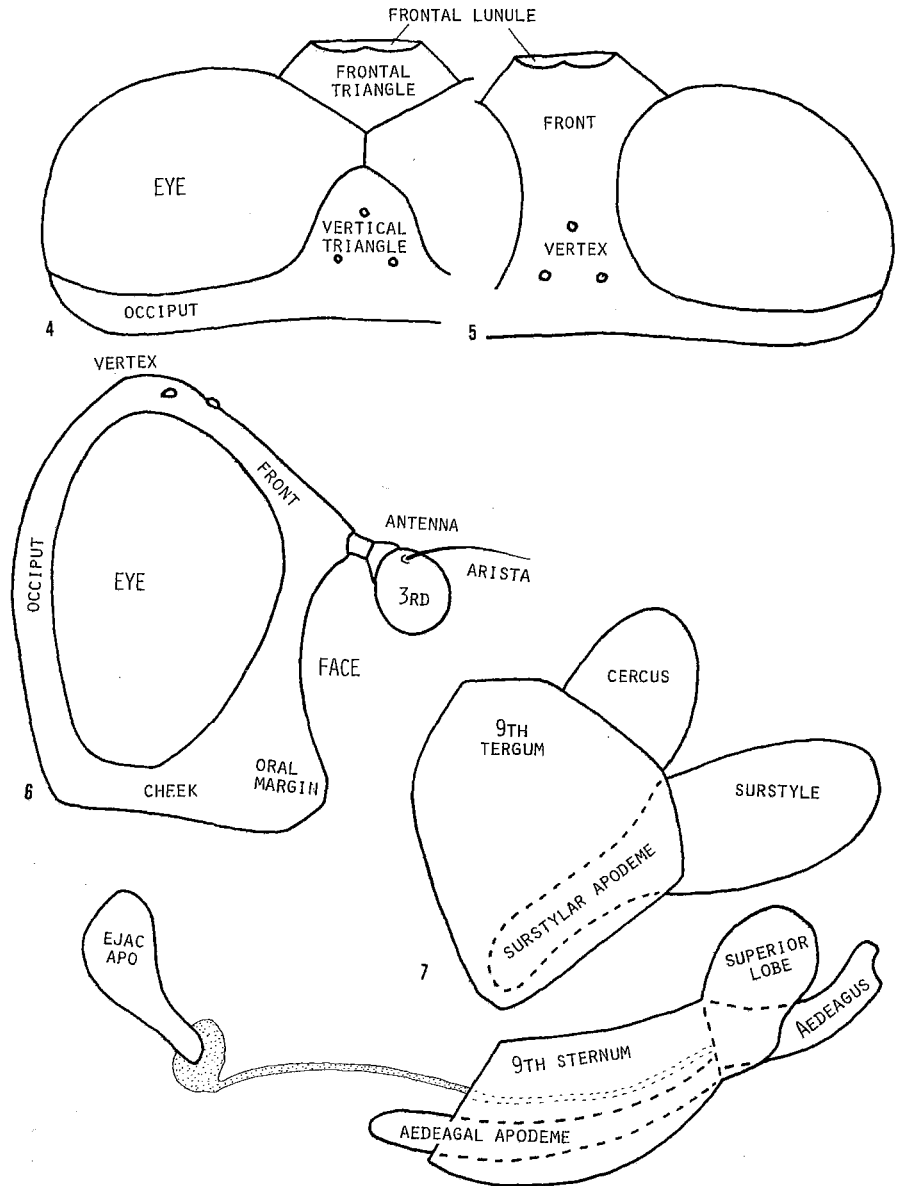
LESSER ANTILLES: *Allograpta limbata*; *A. radiata*; *Pseudodoros clavatus*; *Ocyptamus capitatus*, *O. cylindricus*, *O. dimidiatus*, *O. parvicornis*, *O. deceptor*, *O. species A*; *Toxomerus arcifer*, *T. dispar*, *T. ferroxida*, *T. floralis*, *T. maculatus*, *T. multipunctatus*, *T. musicus*, *T. pictus*, *T. politus*, *T. rohri*; *Ornidia obesa*; *Copestylum apicale*, *C. discale*, *C. infractum*; *C. rectifacies*, *C. vacuum*; *Quichuana dominica*; *Palpada agrorum*, *P. vinetorum*, *P. xanthosceles*; *Meromacrus pratorum*, *M. unicolor*; *Sterphus jamaicensis*.

TAXONOMY

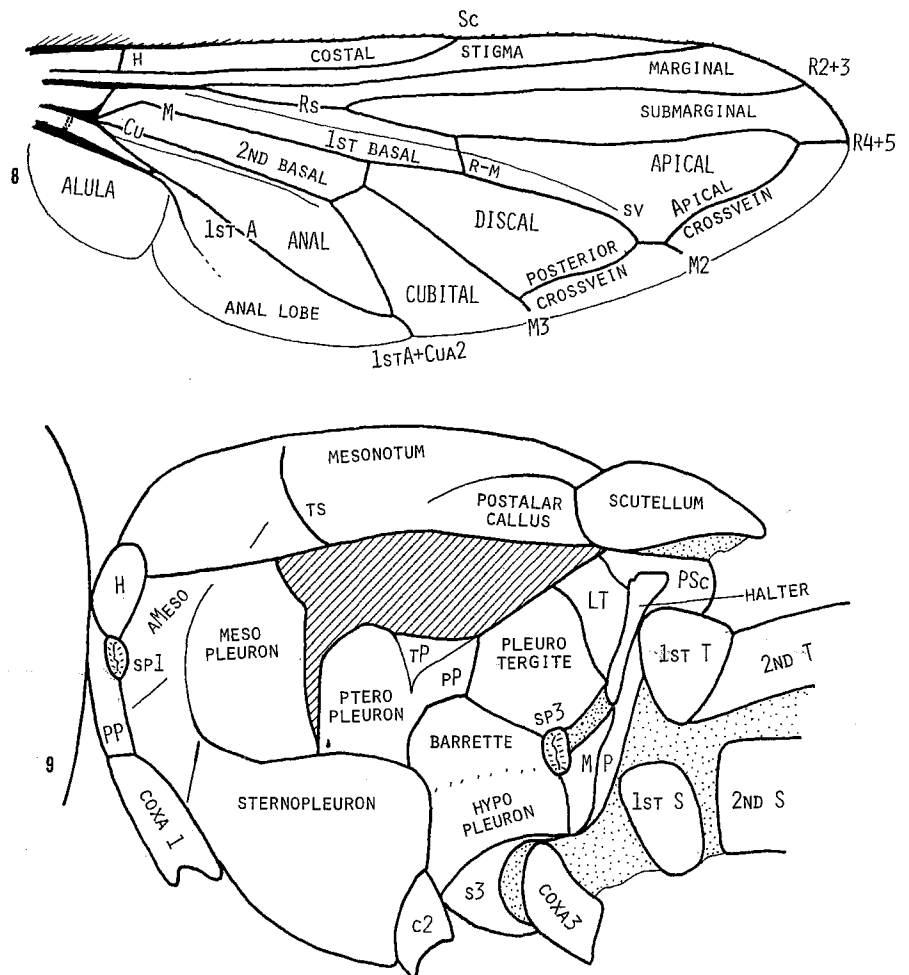
The format of the taxonomic section is traditional; keys are given to the taxa, followed by synonymy, distribution, and discussion of the individual taxa. The following topics require special comment.

Characters.—Most of the characters used in this synopsis are well-known, traditional ones and are identified by reference to Figs. 4–9. More detailed information about these characters can be found in the following basic references: Williston, 1887: 272–278; Verrall, 1901: 127–133; Lundbeck, 1916: 18–34; Shannon, 1922b: 117–120, 1923: 17, 1926a: 6–7; Hull, 1949b: 259–268; Vockeroth, 1969: 17–23; and Thompson, 1972: 77–84, 201. A few new characters have been used in the species classification of *Ocyptamus*; these are explained in detail under that genus.

Subspecies.—The use of subspecific names in this paper is pragmatic. I accept the logic of Wilson and Brown (1953) and others and thereby feel that subspecies are largely meaningless biological concepts, and their names are an unnecessary nomenclatural burden. But despite the many cogent arguments for the abandonment of subspecific names, some authors still recognize and use them. Thus, rather than diminish the usefulness of this paper to workers who use subspecies, I have followed a rather pragmatic course relative to subspecific names. I have not established any new subspecific names. Where populations can be differentiated by certain discrete (non-variable) characteristics, I have endeavored to discuss them. If there are existing names that can be applied to such populations, I have identified them, but in no case have I recognized these names as being valid.



Figs. 4-7. Structures of adult Syrphidae. 4, Head of male, dorsal. 5, Head of female, dorsal. 6, Head of female, lateral. 7, Male genitalia, lateral. ejac apo = ejaculatory apodeme.



Figs. 8-9. Structures of adult Syrphidae. 8, Wing, dorsal. A = anal vein, Cu = cubitus, CuA = anterior branch of cubitus, H = humeral crossvein, M = media, R = radius, Rs = radial sector, Sc = subcosta, sv = spurious vein. 9, Thorax, lateral. aMeso = anterior mesopleuron, c2 = mesocoxa, H = humerus, LT = laterotergite, MP = metapleuron, PP = propleuron, pP = posterior pteropleuron, PSc = postscutellum, S = sternum, S3 = metasternum, Sp = spiracle, T = tergum, tP = triangular portion of pteropleuron, TS = transverse suture.

Gmelin names.—In 1790 when Gmelin compiled the 13th edition of Linnaeus' *Systema Naturae*, he placed all the species that had been described subsequent to the 10th edition into the original 1758 classification. This brought many species described in genera such as *Volucella* Geoffroy, *Syrphus* Fabricius, *Bibio* Geoffroy, etc., together in *Musca* Linnaeus, creating numerous secondary homonyms which Gmelin then renamed. Many of

these Gmelin names, such as *Musca jamaicensis* Gmelin, were never used again except to be listed as synonyms. According to the *Règles* (Richmond, 1926) a rejected homonym can never be used again and thereby the Gmelin name would be the correct name. Under the present *Code* (Stoll *et al.*, 1964; Melville, 1972) primary homonyms are permanently rejected and secondary homonyms rejected before 1961 are "permanently rejected . . . unless the use of the replacement name is contrary to existing usage." Under these circumstances the Gmelin names should be suppressed. Even though I revived a Gmelin name in this paper, I do not necessarily advocate the resurrection of all Gmelin names or disobedience of the *Code*, but I believe that each case should be decided on its own merit. In this particular case, the Gmelin name better serves the purposes of science.

Fabrician type-localities.—Most of the earliest described New World syrphids are from the West Indies. The first to name a syrphid fly from the New World was Drury (1770, 1773) who figured a species from Jamaica (*Meromacrus cinctus*) and another from Virginia (*Milesia virginiensis*). In 1775 Fabricius described three species from "America," two of which he indicated were collected by "v. Rohr." Although Fabricius did not precisely indicate the source of these specimens, it is clear from our knowledge of von Rohr and also from Fabricius' later works that these species were collected in the Virgin Islands, most probably on St. Croix. Zimsen (1964: 14) said of von Rohr: "In 1757 he went for the first time to the West Indies, but the collection of specimens he sent home was lost at sea. In 1765 . . . he was appointed architect in connection with the fortification [at St. Croix] of the islands [=Virgin Islands] . . . In 1783 . . . he made a zoological journey to the Antilles and the nearest countries along the coast of South America, i.e. Cayenne." Thus the material received from von Rohr before 1783 was from the Virgin Islands. In this context it is important to note that Fabricius in his later works qualified "America" or "Americae meridionalis" when the material was from the islands by adding "insulis." For example, the "America" given as the type-locality of *Syrphus* (= *Copestylum*) *vacuum* in 1775 was changed to "Americae insulis" in 1794. The West Indian origin of many of the earliest described New World insects is an important fact which is frequently overlooked. Problems such as that discussed under *Meromacrus pratorum* (Fabricius), arise from the oversight of this key fact.

Hull types.—During the course of this study some problems were discovered concerning the types of a number of West Indian Syrphidae described by Hull and supposedly deposited in the Museum of Comparative Zoology. These problems included missing types (*Leucopodella carmelita* and *Toxomerus ornithoglyphus*), unlabeled types (*Paramicrodon delicatula* and *Leucopodella estrelita*), and discrepancies in label data (*Microdon banksi*). While the problems were different in each case, I feel a general comment is needed because I strongly suspect that all these problems arose

from similar circumstances and that more problems of this kind will be discovered in the future.

Frank M. Hull was a PhD student under Frank Carpenter and worked at the Museum of Comparative Zoology during the late 1930's. During this time, Hull determined many of the specimens in that collection, retaining duplicates where possible. He also labeled some as new species, again retaining specimens. Over a period of years (1937–1950) Hull published the description of these new species. After he left the MCZ, he apparently decided that some of the specimens that he had previously determined as species of other authors were also new. These species were then described on the basis of the material he had retained, but he indicated that the type was in the MCZ. This conjecture is based on the facts that in the two cases where I found no labeled types in the MCZ, 1) the specimens in MCZ had an erroneous Hull determination label, 2) Hull indicated having a paratype with the same data as the type in his collection, and 3) now in the Hull collection there is such a specimen either labeled as a paratype (*Leucopodella estrelita*) or with an erroneous Hull determination identical to that on the MCZ specimen (*Paramicrodon delicatula*). I have designated the MCZ specimen as lectotype in each case, as this is where Hull intended the holotype to be deposited.

KEY TO GENERA OF WEST INDIAN SYRPHIDAE²

1. Humerus bare; with 5 pregenital segments in male 20
- Humerus pilose; with 4 pregenital segments in male 2
2. Postmetacoxal bridge complete; hindfemur and usually tibia with pronounced scars (cicatrices); face convex (Fig. 129) 18
- Postmetacoxal bridge incomplete; legs never with scars (or cicatrices); face usually either tuberculate, concave or straight (Figs. 11–12, 39, 128, 143–147, 183, 187) 3
3. Antenna with a terminal style, inserted on frontal pedicel; frontal pedicel about as long as antenna (Fig. 2) *Ceriana* Rafinesque
- Antenna with an arista, not inserted on a distinct frontal pedicel; frontal pedicel indistinct or absent (Figs. 11–12, 39, 128, 143–147, 183, 187) 4
4. Third vein (R4+5) strongly looped (Figs. 167–169, 172–174); hindfemur with well-developed anterobasal patch of setulae (Figs. 170–171) 13

² This key was specially prepared for the West Indian syrphid fauna, which is very limited in taxonomic diversity. Some species of the included genera from other areas will not key out properly. General keys to the genera of Neotropical Syrphidae can be found in Thompson (Microdontinae, 1969; subfamilies and Eristalinae (=Milesiinae), 1973) and Vockeroth (tribes of Syrphinae, genera of Syrphini, 1969).

- Third vein straight or nearly so (Figs. 24-31, 59-66, 93-100, 128h, 141e, 164-166); hindfemur without such setulae 5
- 5. Anterior crossvein (r-m) perpendicular, before middle of discal cell (M2), usually at basal $\frac{1}{3}$ (Figs. 24-31, 59-66, 93-100, 128h, 141e) 6
- Anterior crossvein slanted, beyond middle of discal cell, usually greatly slanted and extending to outer $\frac{1}{3}$ or more of discal cell (Figs. 185f, 186f) 8
- 6. Arista plumose (Figs. 143-147); apical crossvein (upturned portion of m1+2) strongly recessive, forming an obtuse angle with 3rd vein (r4+5) (Figs. 164, 166) 11
- Arista bare; apical crossvein usually processive, forming an acute angle with 3rd vein, recessive only in *Orthonevra* 7
- 7. Eye pilose; metasternum pilose; scutellum with ventral pile fringe *Trichopsomyia* Williston
- Eye bare; metasternum bare; scutellum without ventral pile fringe 12
- 8. Marginal cell (R1) closed and petiolate; hindfemur with a single apicoventral spur *Milesia* Latreille
- Marginal cell open; hindfemur without a spur 9
- 9. Metasternum bare 10
- Metasternum pilose, with pile as long as that on coxae *Neplas* Porter
- 10. Face straight, with distinct keels (Fig. 187) *Sterphus* Philippi
- Face concave, without keels *Xylota* Meigen
- 11. Pteropleuron with posterior portion pilose; face with medial and 2 small lateral tubercles *Ornidia* Lepeletier and Serville
- Posterior pteropleuron bare; face without lateral tubercle, with only a medial one (Figs. 143-147) *Copestylum* Macquart
- 12. Front and middle femora unarmed, without ventral spines; apical crossvein recessive or vertical, forming either an obtuse or right angle with 3rd vein *Orthonevra* Macquart
- All femora armed with ventral spines; apical crossvein processive, forming an acute angle with 3rd vein *Lepidomyia* Loew
- 13. Marginal cell open (Fig. 174) 14
- Marginal cell closed and petiolate (Figs. 165, 167-169, 172-173) .. 15
- 14. Eye pilose; 3rd antennal segment elongate, at least $1\frac{1}{2}\times$ as long as broad; mesonotum without yellow pollinose vittae *Quichuana* Knab
- Eye bare; 3rd antennal segment oval, as long as broad; mesonotum with yellow pollinose vittae *Helophilus* Meigen
- 15. Eye bare; mesonotum usually with markings of opaque yellow tomentum *Meromacrus* Rondani

- Eye pilose; mesonotum without such tomentose markings 16
- 16. Barrette bare *Eoseristalis* Kanervo
- Barrette pilose 17
- 17. Hypopleuron without pile in front of or below spiracle; arista with short but distinct pile on basal $\frac{1}{2}$; eye densely pilose, with 2 vertical bands of darker pile; wing bare *Eristalis* Latreille
- Hypopleuron with pile in front of and/or below spiracle; arista bare; eye pilose above, but without contrasting bands of pile; wing microtrichose or bare *Palpada* Macquart
- 18. Abdomen petiolate; metasternum undeveloped, reduced to a thin line and bare *Mixogaster* Macquart
- Abdomen elongate or oval, never petiolate; metasternum well developed, pilose, not reduced 19
- 19. Antenna short, less than $\frac{1}{2}$ as long as face; 1st antennal segment never more than $2\times$ as long as broad *Paramicrodon* de Meijere
- Antenna long, always longer than $\frac{1}{2}$ as long as face; 1st antennal segment always much more than $2\times$ as long as broad *Microdon* Meigen
- 20. Face and scutellum black in ground color 21
- Face and/or scutellum partially pale in color, usually yellow or yellowish brown 24
- 21. Abdomen petiolate, much narrower than thorax at petiole 22
- Abdomen oval or with parallel sides, never narrower than thorax 23
- 22. Face tuberculate; anterior flattened portion of mesopleuron with an irregular row of short distinct hairs on upper $\frac{1}{2}$ *Ocyptamus* Macquart
- Face without a tubercle, flat; anterior mesopleuron bare *Leucopodella* Hull
- 23. Antennal pits broadly confluent; face straight with a small, short tubercle (Figs. 80, 128a) *Xanthandrus* Verrall
- Antennal pits broadly separated; face with a long, low tubercle *Rhysops* Williston
- 24. Metasternum bare 25
- Metasternum pilose 30
- 25. Third vein strongly looped (Figs. 67a-69a); postmetacoxal bridge complete; 1st abdominal tergum produced laterally to form large spurs (Fig. 81) *Salpingogaster* Schiner
- Third vein straight or only slightly looped; postmetacoxal bridge incomplete; 1st tergum not so produced (Fig. 82) 26
- 26. Squama with lower lobe pilose *Syrphus* Fabricius
- Squama bare, without long pile on lower lobe 27
- 27. Abdomen margined, oval or parallel-sided; face "beaked," i.e., evenly produced forward from both oral margin and antennal bases; male genitalia with a distinct process arising from surstyler apo-

- demes and in front of cerci (Fig. 105b); thorax always with yellow humerus, mesopleuron, and sternopleuron; abdomen frequently with distinctive yellow and black patterns; wing without markings
 *Toxomerus* Macquart
- Abdomen unmarginated, frequently petiolate; face not “beaked,” with distinct concavity beneath tubercle, if produced forward, then either abdomen petiolate or wing with an apical brown spot; male genitalia without such process; thorax and abdomen frequently dark; wing may have distinctive markings 28
28. Anterior flattened portion of mesopleuron usually with some short distinct hairs posterodorsally; metathoracic epimeron usually with a few long appressed hairs; always with pile on one of these two places *Ocyptamus* Macquart
- Anterior mesopleuron and metathoracic epimeron bare 29
29. Thorax without yellow markings except on scutellum
 *Pseudodoros* Becker
- Humerus yellow; mesonotum with lateral yellow stripe at least in front of suture; mesopleuron and sternopleuron partially yellow; frequently pleuron more extensively yellow
 *Allograpta* Osten-Sacken³
30. Anterior mesopleuron pilose posterodorsally .. *Ocyptamus* Macquart⁴
- Anterior mesopleuron bare *Allograpta* Osten Sacken

SUBFAMILY SYRPHINAE LATREILLE

TRIBE SYRPHINI LATREILLE

Genus *Syrphus* Fabricius

Syrphus Fabricius, 1775: 762. Type-species, *Musca ribesii* Linnaeus (see Wirth et al., 1965: 558) to preserve established usage. References: Fluke, 1942: 2–3 (key, revision Neotropical spp.); Vockeroth, 1969: 55–57 (descript.).

Syrphus is principally a north-temperate group, with a limited extension along the Andean Cordillera into temperate South America, and with one undescribed species known from Java in the Oriental Region. The Neotropical *Syrphus* fauna consists of one superspecies ranging from the Mexican highlands and high altitudes in the Antilles to Patagonia and southern Brazil and a cluster of four or five closely related species in the Chilean subregion.

³ *Antillus* Vockeroth and *Rhinoprosopa* Hull key here, but they are not recognized (Vockeroth, 1973).

⁴ *Orphnabaccha* Hull keys here, but it is not recognized.